



**Additional Sheets for PTO/SB/52**  
**Reissue Application Serial No. 10/632,488**  
**Filed: Aug. 1, 2003**  
**Title: FAST QUENCH REACTOR METHOD**  
**Docket No.: EGG-PI-413A RE**

**Statement of Errors:**

Specific errors being corrected in the present reissue application include:

The correction of the pressure ratio set forth in the paragraph set forth at column 24, lines 28-39 (i.e., the ratio has been changed from "P<sub>0</sub>/P<sub>1</sub>" to – P<sub>1</sub>/P<sub>0</sub> – );

Claim 1 included language specifically directed to apparatus limitations, namely:

the reactor chamber having a predetermined length sufficient to effect heating of the gaseous stream to the selected reaction temperature at which a desired end product is available as a thermodynamically unstable reaction product at a location adjacent [the] an outlet end of the reactor chamber;

Such limitations may not be seen as satisfying the requirements of 35 U.S.C. § 112 since claim 1 might be interpreted as improperly intermixing system/apparatus limitations in a claim belonging to the statutory class of a method or process. Claim 1 has been amended in the present reissue application to now recite:

defining the reactor chamber [having] to exhibit a predetermined length sufficient to effect heating of the gaseous stream to the selected reaction temperature at which a desired end product is available as a thermodynamically unstable reaction product at a location adjacent [the] an outlet end of the reactor chamber;

The inclusion of affirmative method acts in claim 1 provides for proper interpretation of the claim and unambiguous compliance with 35 U.S.C. § 112. This amendment also provides proper antecedent basis in claim 1 for the recited "outlet end" of the reactor chamber.

Claim 5 included the limitations that "the desired end product is titanium metal and the reactant is titanium tetrachloride." The mere recitation of an identified "end product" and a "reactant" might be interpreted as failing to further limit the claim(s) from which claim 5 depends as is required by 37 CFR 1.75(c). Furthermore, such limitations may not be seen as satisfying the requirements of 35 U.S.C. § 112 since claim 5 might be interpreted as reciting system/apparatus limitations while the statutory class of the claim is that of a method or process.

Claim 5 has been amended in the current reissue application to read as follows:

5. The method of claim 2, wherein collecting the desired end product [is] includes collecting titanium metal and, wherein introducing a metal halide [the] reactant [is] includes introducing titanium tetrachloride.

The inclusion of affirmative method acts in claim 5 provides for proper interpretation of the claim and unambiguous compliance with 35 U.S.C. § 112 and 37 CFR 1.75(c).

Claim 6 included the limitations that "the desired end product is vanadium metal and the reactant is vanadium tetrachloride." The mere recitation of a specified "end product" and/or "reactant" might be

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interpreted as failing to further limit the claim(s) from which claim 6 depends as is required by 37 CFR 1.75(c). Furthermore, such limitations may not be seen as satisfying the requirements of 35 U.S.C. § 112 since claim 6 might be interpreted as reciting system/apparatus limitations while the statutory class of the claim is that of a method or process.

Claim 6 has been amended in the current reissue application to read as follows:

6. The method of claim 2, wherein collecting the desired end product [is] includes collecting vanadium metal and, wherein introducing a metal halide [the] reactant [is] includes introducing vanadium tetrachloride.

The inclusion of affirmative method acts in claim 6 provides for proper interpretation of the claim and unambiguous compliance with 35 U.S.C. § 112 and 37 CFR 1.75(c).

Claim 7 included the limitations that "the desired end product is aluminum metal and the reactant is aluminum chloride." The mere recitation of a specified "end product" and/or "reactant" might be interpreted as failing to further limit the claim(s) from which claim 7 depends as is required by 37 CFR 1.75(c). Furthermore, such limitations may not be seen as satisfying the requirements of 35 U.S.C. § 112 since claim 7 might be interpreted as reciting system/apparatus limitations while the statutory class of the claim is that of a method or process.

Claim 7 has been amended in the current reissue application to read as follows:

7. The method of claim 2, wherein collecting the desired end product is includes collecting aluminum metal and, wherein introducing a metal halide the reactant is aluminum chloride.

The inclusion of affirmative method acts in claim 7 provides for proper interpretation of the claim and unambiguous compliance with 35 U.S.C. § 112 and 37 CFR 1.75(c).

Claim 8 included the limitations that "the desired end product is a titanium-vanadium alloy and the reactants are a mixture of titanium tetrachloride and vanadium tetrachloride." The mere recitation of a specified "end product" and/or "reactant" might be interpreted as failing to further limit the claim(s) from which claim 8 depends as is required by 37 CFR 1.75(c). Furthermore, such limitations may not be seen as satisfying the requirements of 35 U.S.C. § 112 since claim 8 might be interpreted as reciting system/apparatus limitations while the statutory class of the claim is that of a method or process.

Claim 8 has been amended in the current reissue application to read as follows:

8. The method of claim 2, wherein collecting the desired end product [is] includes collecting a titanium-vanadium alloy and, wherein introducing a metal halide [the reactants are] reactant includes introducing a mixture of titanium tetrachloride and vanadium tetrachloride.

The inclusion of affirmative method acts in claim 8 provides for proper interpretation of the claim and unambiguous compliance with 35 U.S.C. § 112 and 37 CFR 1.75(c).

Claim 9 included the limitations that "the desired end product is a titanium-boron composite ceramic powder and the reactants are titanium tetrachloride and boron trichloride." The mere recitation of a

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specified "end product" and/or "reactant" might be interpreted as failing to further limit the claim(s) from which claim 9 depends as is required by 37 CFR 1.75(c). Furthermore, such limitations may not be seen as satisfying the requirements of 35 U.S.C. § 112 since claim 9 might be interpreted as reciting system/apparatus limitations while the statutory class of the claim is that of a method or process.

Claim 9 has been amended in the current reissue application to read as follows:

9. The method of claim 2, wherein collecting the desired end product [is] includes collecting a titanium-boron composite ceramic powder and, wherein introducing a metal halide [the reactants are] reactant includes introducing titanium tetrachloride and boron trichloride.

The inclusion of affirmative method acts in claim 9 provides for proper interpretation of the claim and unambiguous compliance with 35 U.S.C. § 112 and 37 CFR 1.75(c).

Claim 10 included the limitations that "the desired end product is uranium and the reactant is uranium hexafluoride." The mere recitation of a specified "end product" and/or "reactant" might be interpreted as failing to further limit the claim(s) from which claim 10 depends as is required by 37 CFR 1.75(c). Furthermore, such limitations may not be seen as satisfying the requirements of 35 U.S.C. § 112 since claim 10 might be interpreted as reciting system/apparatus limitations while the statutory class of the claim is that of a method or process.

Claim 10 has been amended in the current reissue application to read as follows:

10. The method of claim 2, wherein collecting the desired end product [is] includes collecting uranium and, wherein introducing a metal halide [the] reactant [is] includes introducing uranium hexafluoride.

The inclusion of affirmative method acts in claim 10 provides for proper interpretation of the claim and unambiguous compliance with 35 U.S.C. § 112 and 37 CFR 1.75(c).

Claim 11 included the limitations that "the desired end product is uranium, the reactant is uranium hexafluoride, and the reducing gas is hydrogen." The mere recitation of a specified "end product," "reactant" and/or "reducing gas" might be interpreted as failing to further limit the claim(s) from which claim 11 depends as is required by 37 CFR 1.75(c). Furthermore, such limitations may not be seen as satisfying the requirements of 35 U.S.C. § 112 since claim 11 might be interpreted as reciting system/apparatus limitations while the statutory class of the claim is that of a method or process.

Claim 11 has been amended in the current reissue application to read as follows:

11. The method of claim 4, wherein collecting the desired end product [is] includes collecting uranium, wherein introducing a metal halide [the] reactant [is] includes introducing uranium hexafluoride, and wherein introducing a [the] reducing gas [is] includes introducing hydrogen.

The inclusion of affirmative method acts in claim 11 provides for proper interpretation of the claim and unambiguous compliance with 35 U.S.C. § 112 and 37 CFR 1.75(c).

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Claim 12 recited that "the first introduction of reducing gas to the gaseous stream is prior to or at the time of the injection of the uranium hexafluoride." However, the term "injection" (including any form thereof) had not been previously recited by the base or intervening claims from which claim 12 depends.

Claim 12 has been amended in the current reissue application to read as follows:

12. The method of claim 11, wherein the [first introduction of reducing gas to the gaseous stream] introducing hydrogen is effected prior to or at the time of the [injection of the] introducing uranium hexafluoride.

The removal of the term "injection" from claim 12 removes any potential ambiguity regarding the term "injection" and ensures compliance with 35 U.S.C. § 112.

Claim 13 previously recited "adding additional reducing gas to the reactant stream is immediately before the nozzle throat, at the nozzle throat, or immediately after the nozzle throat." However, the nozzle's "throat" had not been previously recited by the base or intervening claims from which claim 13 depends.

Claim 13 has been amended in the current reissue application to read as follows:

13. The method of claim 12, wherein [the step of] adding additional reducing gas to the reactant stream is effected immediately before [the] a throat of the nozzle throat, at the throat of the nozzle [throat], or immediately after the throat of the nozzle [throat].

The amendment of claim 13 provides proper antecedent basis for the term "throat" and ensures compliance with 35 U.S.C. § 112.

Claim 14 previously recited:

introducing a stream of plasma arc gas between the electrodes of a plasma torch including at least one pair of electrodes positioned at the inlet end of an axial reactor chamber, the stream of plasma arc gas being introduced at a selected plasma gas flow while the electrodes are subjected to a selected plasma input power level to produce a plasma within the reactor chamber and extending toward its outlet end;

However, "the inlet end" and "its outlet end" (referring to the reactor chamber) were not previously recited in the claim. Claim 14 has been amended in the current reissue application to now read as follows:

introducing a stream of plasma arc gas between the electrodes of a plasma torch including at least one pair of electrodes positioned at [the] an inlet end of an axial reactor chamber, the stream of plasma arc gas being introduced at a selected plasma gas flow while the electrodes are subjected to a selected plasma input power level to produce a plasma within the reactor chamber and extending toward [its] an outlet end thereof;

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The amendment of claim 14 provides proper antecedent basis for the terms "inlet end" and "outlet end" and ensures compliance with 35 U.S.C. § 112.

Additionally, claim 14 included language specifically directed to apparatus limitations, namely:

the length of the reactor chamber being sufficient to effect heating of the gaseous stream to a selected equilibrium temperature at which a desired end product is available as a thermodynamically unstable reaction product within the gaseous stream at a location adjacent to the outlet end of the reactor chamber;

Such limitations may not be seen as satisfying the requirements of 35 U.S.C. § 112 since claim 14 might be interpreted as improperly intermixing system/apparatus limitations in a claim belonging to the statutory class of a method or process. Claim 14 has been amended in the present reissue application to now recite:

defining the length of the reactor chamber [being] such that it is sufficient to effect heating of the gaseous stream to a selected equilibrium temperature at which a desired end product is available as a thermodynamically unstable reaction product within the gaseous stream at a location adjacent to the outlet end of the reactor chamber;

The inclusion of affirmative method acts in claim 14 provides for proper interpretation of the claim and unambiguous compliance with 35 U.S.C. § 112.

Claim 17 previously stated that "the reducing gas is hydrogen." The mere recitation of a specified "reducing gas" might be interpreted as failing to further limit the claim(s) from which claim 17 depends as is required by 37 CFR 1.75(c). Furthermore, such limitations may not be seen as satisfying the requirements of 35 U.S.C. § 112 as claim 17 might be interpreted as reciting system/apparatus limitations although the statutory class of the claim is a method/process.

Claim 17 has been amended in the current reissue application to read as follows:

17. The method of claim 14, wherein introducing a [the] reducing gas [is] includes introducing hydrogen.

The inclusion of an affirmative method act in claim 17 provides for proper interpretation of the claim and unambiguous compliance with 35 U.S.C. § 112 and 37 CFR 1.75(c).

Claim 18 previously stated that "the desired end product is uranium and the reactant is uranium hexafluoride." The mere recitation of a specified "end product" and/or "reactant" might be interpreted as failing to further limit the claim(s) from which claim 18 depends as is required by 37 CFR 1.75(c). Furthermore, such limitations may not be seen as satisfying the requirements of 35 U.S.C. § 112 since claim 18 might be interpreted as reciting system/apparatus limitations while the statutory class of the claim is that of a method or process.

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Claim 18 has been amended in the current reissue application to read as follows:

18. The method of claim 17, wherein separating desired end products from the gases remaining in the cooled gaseous stream includes separating [the desired end product is] uranium from the cooled gaseous stream and, wherein injecting at least one metal halide reactant into the reactor chamber includes injecting [the reactant is] uranium hexafluoride.

The inclusion of affirmative method acts in claim 18 provides for proper interpretation of the claim and unambiguous compliance with 35 U.S.C. § 112 and 37 CFR 1.75(c).

Claim 19 previously stated that "the desired end product is titanium and the reactant is titanium hexafluoride." The mere recitation of a specified "end product" and/or "reactant" might be interpreted as failing to further limit the claim(s) from which claim 19 depends as is required by 37 CFR 1.75(c). Furthermore, such limitations may not be seen as satisfying the requirements of 35 U.S.C. § 112 since claim 19 might be interpreted as reciting system/apparatus limitations while the statutory class of the claim is that of a method or process.

Claim 19 has been amended in the current reissue application to read as follows:

19. The method of claim 17, wherein separating desired end products from the gases remaining in the cooled gaseous stream includes separating [the desired end product is] titanium from the cooled gaseous stream and, wherein injecting at least one metal halide reactant into the reactor chamber includes injecting [the reactant is] titanium hexafluoride.

The inclusion of affirmative method acts in claim 19 provides for proper interpretation of the claim and unambiguous compliance with 35 U.S.C. § 112 and 37 CFR 1.75(c).

Claim 21 previously stated that "the other reactant is hydrogen and the titanium compound is titanium tetrachloride." The mere recitation of a specified "end product" and/or "reactant" might be interpreted as failing to further limit the claim(s) from which claim 21 depends as is required by 37 CFR 1.75(c). Furthermore, such limitations may not be seen as satisfying the requirements of 35 U.S.C. § 112 since claim 21 might be interpreted as reciting system/apparatus limitations while the statutory class of the claim is that of a method or process.

Claim 21 has been amended in the current reissue application to read as follows:

21. (Currently Amended) The method of claim 20, wherein introducing one or more [the other reactant is] other reactants includes introducing hydrogen and, wherein decomposing a [the] titanium compound [is] includes decomposing titanium tetrachloride.

The inclusion of affirmative method acts in claim 21 provides for proper interpretation of the claim and unambiguous compliance with 35 U.S.C. § 112 and 37 CFR 1.75(c).

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Claim 23 included language specifically directed to apparatus limitations, namely:

the reactor chamber having a predetermined length sufficient to effect heating of the gaseous stream to a selected reaction temperature at which a desired end product is available as a thermodynamically unstable reaction product at a location adjacent [the] an outlet end of the reactor chamber;

Such limitations may not be seen as satisfying the requirements of 35 U.S.C. § 112 since claim 23 might be interpreted as improperly intermixing system/apparatus limitations in a claim belonging to the statutory class of a method or process. Claim 23 has been amended in the present reissue application to now recite:

defining the reactor chamber [having] to exhibit a predetermined length sufficient to effect heating of the gaseous stream to a selected reaction temperature at which a desired end product is available as a thermodynamically unstable reaction product at a location adjacent [the] an outlet end of the reactor chamber;

The inclusion of affirmative method acts in claim 23 provides for proper interpretation of the claim and unambiguous compliance with 35 U.S.C. § 112. This amendment also provides proper antecedent basis in claim 23 for the recited "outlet end" of the reactor chamber.